20th IAA SYMPOSIUM ON SPACE DEBRIS (A6)
Mitigation - Tools, Techniques and Challenges - SEM (4)

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# PROCEDURE FOR THE ASSESSMENT OF THE SPACE DEBRIS ENVIRONMENT IMPACT OF A MISSION

**Abstract**

Over the past years, different metrics have been proposed to quantify the debris risk associated to a space mission, intended as the potential of generating new debris, of contributing to the instability of the space debris environment or of interference with other missions. These metrics have received interests both from regulators and from operators as a tool to further characterise a mission in the review of its compliance to space debris mitigation guidelines and to inform, already in the early phase of a mission, of how design choices can affect the sustainability of space operations.

Given this context and the technical developments carried out at the European Space Agency (ESA) in this field, the current paper proposes a review of the methodology applied in the agency and some practical considerations for operators and other users interested in applying the same methodology to their missions. In particular, the paper will give a brief overview of the steps to be performed for such an assessment using as a computational engine a web frontend that ESA plans to release in the upcoming months, an compare these assessments with others in the public domain. While a full implementation of the methodology (including the integration with other ESA tools such as DISCOS and DRAMA) is currently on-going through one of the activities in ESA's Space Safety Programme, the frontend discussed in the current paper offers a simplified, but effective, formulation and computational process. It is meant to respond to the growing interest in such methodologies, giving operators the possibility to get familiar with this type of assessment by simulating different scenario and exploiting an interactive tool.

The paper will discuss which inputs are required for the analysis, the assumptions introduced for the computation through the frontend, and it will present some test cases that could serve as templates for interested operators and users within the context of current space debris mitigation practices.